Celfocus Digital Overlay Architecture

An Evolutionary Approach to Embrace Full Digitalisation

KEY TAKEAWAYS

Challenges and motivations to shift to a Digital Architecture.

What is the Celfocus Digital Overlay Architecture.

How can the Celfocus Digital Overlay Architecture help adopters achieve full digitalisation.

WHO SHOULD READ THIS DOCUMENT?

Head of Architecture

Chief Digital Officer

Chief Technology Officer

CELFOCUS

Digital is the New Normal

The impact Digital has been having on most industries, regardless of sector or geography, is undeniable. Leaders acknowledge how imperative change is but struggle to understand how their organisations can avoid risk and deliver value in this new Era.

Digital enables large-scale innovation and disruption, driving efficiency gains and transforming how customers are engaged and served. This is pushing organisations to reinvent themselves to become more diverse, relevant, competitive and differentiated in the marketplace.

Boardrooms across the globe have shifted the digital transformation journey to top priority and concern. As a consequence of extrinsic driven pressure, the sense of urgency to react with structural change deep in the organisational tissue is higher today than ever before.

This pressure arises from different agents: **customers**, who demand to engage on their own terms; new **digital-native competitors**, who are introducing disruptive business models; and emerging **new collaborative ecosystems**, which are blurring the boundaries between partnership and competition, forcing organisations to open up and adjust to a new value chain.

The Cost of Doing Business

There is a tension between continuing to serve customers, hitting sales targets and embarking on a digital transformation journey all at the same time. Maintaining 'business as usual' does not future-proof an organisation, nor does delaying the transformation of operations.

Customers' needs and expectations generate **Business** priorities that in turn must be provided by the underlying **IT** foundation. With the current systems, IT teams scramble to give Business teams the tools and solutions to better address Customers' demands.

In this fragile balance, organisations are transforming their structures to embrace the Digital Economy. However, they are not hostages of the context and can also play the game by taking advantage of technology and by streamlining processes, adopting an agile mindset and revisiting the existing operational model.

How are Current IT Architectures Coping?

Current IT Architectures are, typically, a result of a series of mergers and acquisitions and independent transformation programs with inconsistent technological waves and architectural paradigms. The outcome is a multitude of IT systems' stacks segregated by line of business, customer segment or by type of offer or service. This results in the following:

Multiple, non-integrated, vertical channels for each business segment and/or service;

Lack of process aggregation or related data consolidation over multiple independent stacks;

Segregated customer data, not shared between different stacks, and siloed analytical tools;

Redundant functions, which cause higher effort and cost to maintain and evolve the overall architecture.

These actions have gradually led the current IT architectures to become **rigid** when considering incorporating new requirements, typically demanding efforts in multiple systems, components or even stacks. They have also become **closed to the world** regarding integration between stacks and with outside systems, reducing the ability to reuse functions and speed up functionality delivery. Together, these two characteristics pose constraints on both the pace in which new requirements are made available and the overall cost to deliver and maintain the solution.

Architectures have become complex and slow evolution environments, unable to meet current business requirements. They also lack a clear path to address the digital business scenarios and specific needs in terms of flexibility, openness, speed and cost-effectiveness.

The mentioned facts ultimately lead business units to demand from IT to be able to support more agile business models, **allowing new services and products to be launched more quickly and cost-effectively**.

A Path to Full Digitalisation

As business is constantly evolving, IT architectures' responsiveness to change must be improved to be more flexible by design. While current systems may still be able to improve the overall effectiveness and increase the available capabilities, they struggle to provide the foundations for organisations to efficiently respond to new demands and competitors' challenges.

An evolutionary IT architecture enables incremental changes over time, becoming crucial to being able to cope with a new reality that demands agility and fast pace, whilst relying on **innovative and scalable frameworks** with self-contained capabilities.

An **overlay architecture** makes the most of legacy systems and of mature landscapes that support the business effectively and provide single integrated processes and data view over existing independent stacks to all channels. It also allows for the deploying of basilar foundations, providing a transient evolutionary path to support next-generation service delivery, deliver fit-for-purpose business insight leveraged on Big Data and Machine Learning Technologies, whilst driving the architecture to a fully digital state at the end of the process.

The overlay architecture ensures the introduction of the necessary changes in the adopted architectural patterns, in a non-disruptive fashion, to ensure the feasibility in preparing for the fast and exponentially growing demands and needs of the future. It sets the baseline to support new approaches that will allow a shift in the architecture paradigm to a more agile and adaptable one, supported on the idea of an evolutionary architecture that does not aim to predict the future, but rather to adapt to the ever-changing present. IT will be able to support the new digital business scenarios and lead the change.

The full digital architecture cannot be achieved with a one-size-fits-all approach. Instead, it may be accomplished by dividing systems into smaller components augmented by specific capabilities, in line with the microservices paradigm, or replaced with third-party SaaS solutions, depending on specific corporative needs or strategy.

Microservices and SaaS solutions can be applied singularly or in a combined manner, according to what best suits the defined scenario. It is important to point out that the selected solution must, on one hand, ensure flexibility, speed and agility to enable business differentiation and a quick service delivery; and, on the other, that it must not compromise the evolvability, adaptability and agility of the architecture, nor be a constraint for coping with new demands.

Presenting **Celfocus Digital Overlay Architecture**

Celfocus Digital Overlay Architecture is the first step towards full digital embracement. It consists of a phased approach that paves the way to the migration from legacy to full digital architecture, introducing or moving the required functions and functional domains.

Legacy - - - - - - Digital Overlay - - - - - > Full Digital
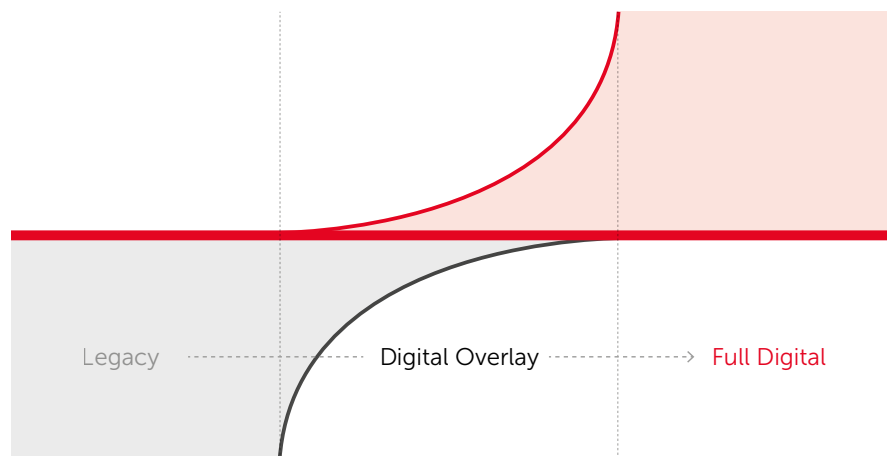
Celfocus Digital Overlay Architecture lays the groundwork for IT requirements and allows the overall architecture to address the pain-points observed in legacy architectures and to make the fundamental shift towards new paradigms.

This shift is supported by five pillars:

1 **Data.** Leverage on information to drive and make decisions.

2 **Abstraction.** Simplify the complexity of supporting building blocks to ease adoption by consuming parties.

3 **API.** Open relevant functions to promote reusability.

4 **Autonomy.** Combine multiple paradigms to ensure evolvability and adaptability.

5 **Cloud.** Take advantage of its characteristics to support business and operations at scale.

Together the key pillars **create and promote a matrix of capabilities required to support the needs of modern digital companies**, which cover the supporting infrastructural needs, the processing of information and the ability to launch offers and adapt to market and behavioural or contextual needs promptly, while introducing a common vision for available offering and processes. They also allow the necessary architectural principles to be defined.

Legacy	Digital Overlay	Full Digital
PAIN-POINTS: rigid, closed, slow, high cost	**PILLARS:** data, abstraction, API, autonomy, cloud	**NEW PARADIGM:** flexible, open, fast, cost-optimized

Celfocus Digital Overlay Architecture is built on a set of **fundamental principles** that shape the five key pillars with smaller or greater influence.

Legend:
+ = smaller influence
+++ = greater influence

PRINCIPLES	Data	Abstraction	API	Autonomy	Cloud
API-Based	++	++	+++	+	+
Virtualisation	++	+++	+++	++	+
Loose Coupling	++	+++	+++	+++	+
Componentisation and Modularity	++	++	+++	+++	+
Scalability	++	+	+	+++	+++
Extensibility	+	+++	++	+++	+
Reusability	++	++	+++	+++	+
Ecosystem-Capable	++	+++	+++	++	+
API Openness	+	+	+++	++	+
Standardisation	++	++	+++	++	+
Dynamic Integration	++	+	+++	++	+
Data-Driven	+++	+	++	++	+
Pervasive Data Access	+++	++	+++	++	+
Independent Business Processes	++	+++	++	++	+
High Availability	+	++	+	+++	+++
Nonstop	++	+++	+	+++	++
Lean BSS	+	++	+++	+++	++
Multi-Channel Support	++	+++	+++	++	+
Security	+++	+	+++	++	++

For instance, the principle of Scalability is most closely related to the pillars of Autonomy and Cloud, as it implies that the architecture must ensure platform responsiveness and performance by scaling quickly and efficiently according to needs (elastically) and by guaranteeing the necessary throughput.

Building Blocks

IT architectures are evolving to be comprised of:

**Systems of Engagement** – user-centric systems that promote peer collaboration and interactions;

Systems of Record – reliable, reference systems that are the authoritative data source for a data element or entity;

Systems of Insight – analysis systems that support and improve customer experience through the analysis of data with statistical modelling tools to detect patterns, report, predict outcomes with a high degree of confidence, apply business rules and policies, and provide actionable insights.

Using this grouping, the Celfocus Digital Overlay Architecture overview introduces a **Digital Platform** composed by **three main layers** and **three cross-cutting blocks**.
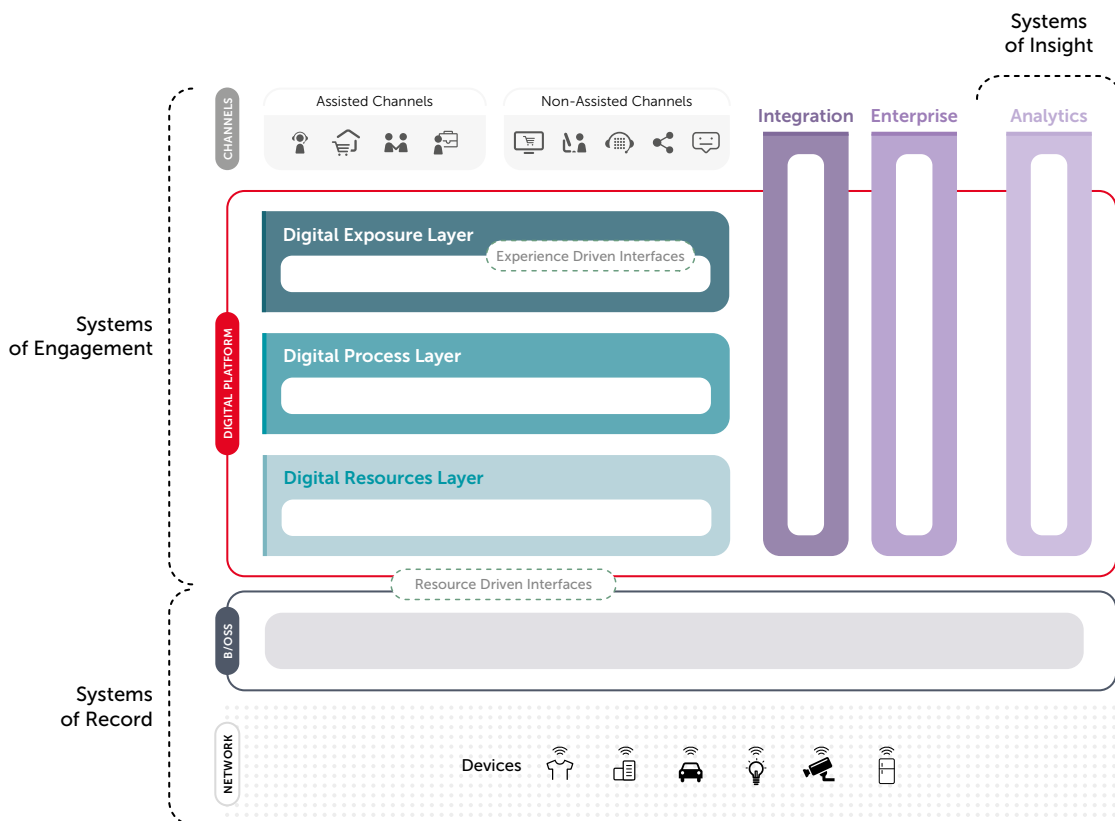
Digital Platform
Three Main Layers

Digital Exposure Layer

Resorting to the exposure of information that is meaningful to consumers, the Experience-Driven Interfaces encompass the Digital Exposure Layer acting as a gatekeeper to the internal organisation systems.

By exposing APIs to outside parties, the partnership with digital ecosystems is facilitated, setting the rules for interfacing with the underlying systems and ensuring security policies.

Digital Process Layer

The Digital Process Layer manages process orchestration and related business logic abstracted from the underlying supporting systems. This layer provides virtualisation over the internal architecture resources, leveraging their exposure to channels and external systems whilst supporting both a seamless and consistent cross-channel experience, and a faster launch of new business processes. The same business process can be discarded without impacting other components in the architecture.

Digital Resources Layer

Encompassing Resource-Driven Interfaces, that aim to manage the lifecycle of processes and resources on master systems, the Digital Resources Layer ensures the virtualisation of data records and underlying logic, leveraging business process definition. It is responsible for all interactions and data access associated with resources, abstracting its access and specificities to the Process Layer.

This layer provides a virtualisation over resources and logic, self-contained or from legacy systems, and exposes them to Digital Process Layer. This capability enables later evolutions to a full digital architecture without disruptive changes to both the Process Layer and the overall architecture.

Digital Platform
Cross-Cutting Blocks

Integration

Integration focuses on managing and ensuring the separation of functional borders, guaranteeing that services provided by each component can be combined flexibly. It facilitates and promotes componentisation and decoupling principles by ensuring communication between APIs.

At an external level, an outbound integration with external ecosystems is ensured, allowing new services to be implemented by leveraging on a wide array of external resources; and, internally, it implements message bus capabilities that allow components to inter-communicate.

Enterprise

Enterprise consolidates data using a common model because a pervasive data architecture is required as a foundation to create a single view of a customer, simplifying the overall architecture and data synchronisation processes.

It is responsible for granting access to data and information by all users and systems across different functions in near real-time, for enabling the availability of dedicated digital data used to support the required user experience, and for providing the necessary capabilities to manage and support digital content creation and modification.

Analytics

Analytics consolidates Big Data capabilities to recognise patterns and react in near real-time, aimed at supporting and improving customer experience through the consumption, collection and analysis of data. It relies on analytical data to develop insights for decision support, intent-based actions or advice.

Also aimed at bringing continuous improvement, optimisation and prediction, Analytics measures and monitors data from network to customer experience, aggregated and consolidated throughout all layers.

Evolutionary Approach Roadmap

The Digital Overlay will work as the foundation for the future digital architecture. It relies on an evolutionary approach that gradually enriches itself with relevant digital capabilities to serve the business iteratively. This will allow success to be measured during the whole process and the strategy to be adjusted accordingly.

Start from the current landscape,

setup the digital overlay underlying infrastructure, continuous delivery pipeline and API management system. Define and implement an MVP that will allow the deployment of the first capabilities provided by the digital layer, based on a quick-win approach to establish the concept. This will require a change not only in technology but also in processes and organisation.

Prioritise the implementation of capabilities,

in order to reduce, or even eliminate, dependencies on traditional supporting systems and to enable agility and speed for the business to differentiate and evolve according to the defined strategy.

Following an iterative approach, create more digital capabilities and expand the solution's reach both horizontally and vertically by:

- **Implementing new capabilities**, developed in-house or by third-parties (e.g. integrate with SaaS);

- **Augmenting capabilities** from backends in the Digital Overlay;

- **Migrating traditional supporting systems in a phased way** to the Digital Overlay as independently scalable, evolvable and more specialised applications (e.g. microservices, third-party SaaS), focused on covering specific business domains.

Achieve Full Digital Architecture:

as an end state, fully leverage on independently evolvable and scalable applications (e.g. microservices, third-party SaaS), technologically revamped in order to provide maximum flexibility, speed and agility for business differentiation and a quick delivery of services to the customer.

We believe that Celfocus Digital Overlay Architecture concepts can be applied across different industries. To provide a general understanding of how this overview can be applied to one in particular, we will look at the Telecommunication industry, as it is currently under a profound change in a myriad of dimensions, driving CSPs to reposition themselves as Digital Service Providers.

From Communication Service Provider to **Digital Service Provider**

The Evolution of the Telco Industry and the Challenges for Current IT Architectures

Over the last decade, the rise of the Digital Era has been rapidly changing the Telecommunications industry in terms of **technological advances**, **service delivery** and **competitive landscape**.

Formerly, Telcos used to offer mass services, without deep personalisation capabilities, but digital transformation has upped the ante. Today, customers are increasingly demanding concerning flexibility and customisation. Additionally, 5 billion people at a global level are expected to be using mobile internet by 2025, corresponding to a penetration rate of over 60%.[1] This raises customers' expectations for service delivery to be agnostic of time or location.

Besides this, many companies in wider tech and digital spaces are reaping the benefits of an expanding digital ecosystem. Over-the-Top (OTT) service providers are setting the pace by using digital means to present alternative, less costly and convenient services, with value-added features to customers, which have been negatively impacting the uptake of CSPs' core and traditional offers, namely Voice and SMS.

Additionally, there are also new digital-first mobile operators, which offer data-focused, innovative and customisable services targeted at younger generations of tech-savvy users, who represent an attractive slice of the market.

1 Source: GSMA The Mobile Economy 2020

Furthermore, disruptive and scale-demanding technologies like Artificial Intelligence (AI), Internet of Things (IoT) and 5G have emerged.

Promising ultra-reliable, secure and low latency communications, high data speed and high bandwidth coverage and scalability, 5G is expected to unleash massive, data-hungry IoT projects and to create a more IoT-friendly ecosystem, with vast improvements over 4G capabilities.

In its turn, there is a widespread recognition that AI will be key to future business and digital transformation, as well as driving increasingly autonomous and intelligent networks and improving the customer experience through greater learning of customer behaviour.

Used to dominating the market, towards this scenario CSPs are being pushed to reinvent and reposition themselves as Digital Service Providers, whilst having to cope with new infrastructure and scale requirements:

1 **Network congestion:** as more and more people use OTT services, an overall strain is put on the network. In current Telco IT architectures, OSS lacks a consolidated view over inventory and network topology, service impact assessments and fully developed real-time monitoring. Increasing network complexity and absence of end-to-end service fulfilment paves the way to zero-touch cognitive automation of network operations and a holistic view of the full operational lifecycle, relying on AI and Machine Learning;

2 **An unprecedented amount of data to collect, process and act on**, raising the profile of CSPs as data aggregators. In fact, CSPs benefit from having access to a huge amount of data, whose value is not being fully explored. This may be due to either non-integrated solutions, complex and heterogeneous processes, or undeveloped real-time capabilities to provide fast data. As data is becoming ever more important in the Digital Age, it must be managed as a corporate asset. However, agility is needed to be able to act on those insights at the right time;

3 **High dependency of channels on BSS, holding CSPs back from delivering a consistent cross-channel customer experience:** there are multiple and non-consolidated channels that are highly dependent on BSS. Since BSS handle all core logic and data, virtualisation mechanisms may lower this high dependency and tight coupling.

The end goal is to deliver customer value by addressing a growing demand for a more flexible and tailored offer.

How Celfocus Digital Overlay Architecture Fits in the Telco World

The Digital Platform introduced by Celfocus Digital Overlay Architecture may be instantiated into the Telco universe by framing the Digital Platform's layers and cross-cutting domains into TM Forum's Application Framework (TAM).

The following figure shows their correspondence:
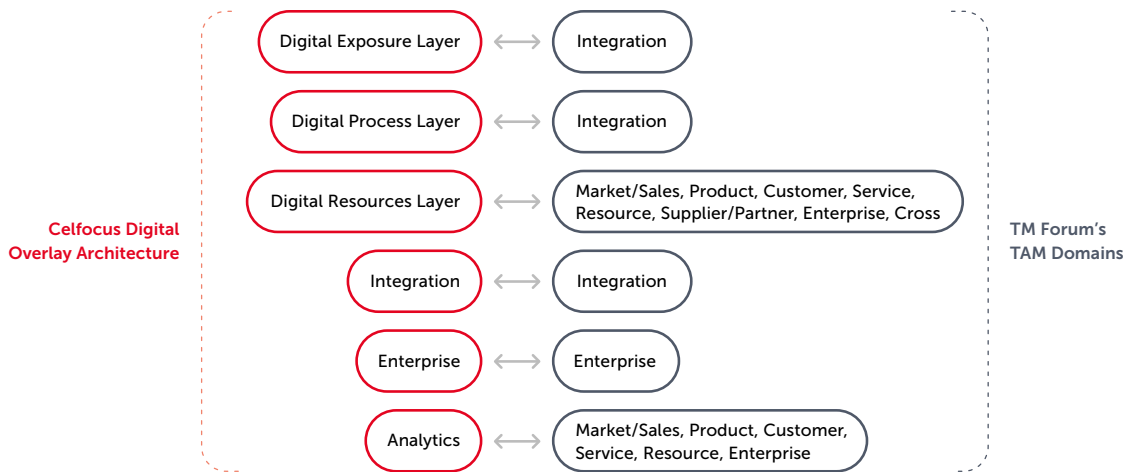
Note that there are cases in which the same TM Forum TAM domain is identified in different layers/blocks, since there are different application types inside TM Forum TAM domains that can be, and are, located in distinct layers/blocks in the architecture (e.g. Integration, which is materialised as API Management in the Digital Exposure Layer and as Enterprise Application Integration in the Integration block).

The correspondence mapping can be seen as a first step towards the application positioning in the Digital Overlay architecture as the move towards a fully digital architecture is embraced. However, digital architectures blur the current segregation between supporting systems.

In that sense, TM Forum proposes a similar architectural approach to full digital embracement, Open Digital Architecture (ODA), which sets a new vision for OSS and BSS and a standard for the design of open digital platforms. With the ambition to deliver a model- and data-driven architecture that relies on the use of metadata, microservices and a clear set of normalised APIs, ODA offers an industry-agreed blueprint, language and set of key design principles to follow.

When comparing to Celfocus Digital Overlay Architecture to [TM Forum ODA](#), there are some similarities and differences to point out.

Regarding common points, both propositions separate the interaction tier from core processual systems. This clear decoupling allows each channel to rely on the same processes, functions and data, providing a true cross-channel capacity.

This is a benefit for both the user and IT, which can develop processes only once for every channel. The only difference is in the naming of the interaction tier – in TM Forum ODA it is Engagement Management, while in Celfocus Digital Overlay Architecture it is Channels.
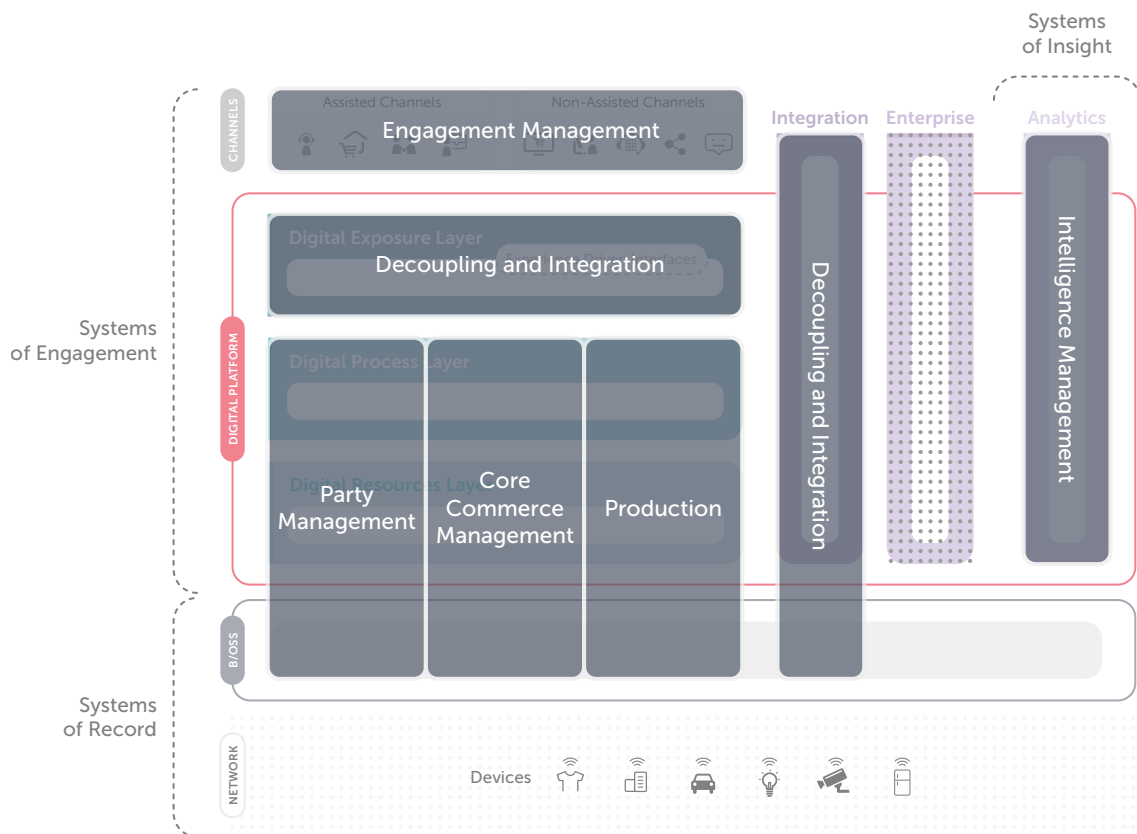
Oppositely, there is no match found for Celfocus Digital Overlay Architecture's Enterprise block in TM Forum ODA, being data management strategy not yet detailed in TM Forum ODA. Also, in TM Forum ODA, operational processes are described in three blocks (Party Management, Core Commerce Management and Production) based on their functional domain, while processes in Celfocus Digital Overlay Architecture are defined in a common layer (Digital Process Layer) and integrated into Digital Platform, which acts as the enabler for flexibility and independence of the business processes from the underlying record systems.

Becoming a Digital Service Provider

A Digital Service Provider (DSP) requires a **reliable supporting infrastructure** to be able to launch offers and adapt to behavioural or contextual market demands promptly, putting deep-dive analytics into good use to generate actionable insights about customers.

Being the owner of the essential connectivity infrastructure that allows other sectors to function and grow in the Digital Economy, being this the core of a CSP, becoming a DSP leverages the advantage as connectivity provider by continuing to offer communication connectivity services, but expands its portfolio with new digital services to address new offers for telco end users, address new markets and foster partnerships.

Recognising the importance of digital partnerships, a DSP embraces an open ecosystem approach to integrate value-added partners, which are key to adapt to this "thinking digital" paradigm and to coexist with OTTs.

Benefits of Celfocus Digital Overlay Architecture for Digital Service Providers

The key pillars of the Digital Overlay create and promote a mesh of capabilities required to support the needs of the modern Digital Operator that cover the supporting infrastructural needs, the processing of information, the ability to launch offers and adapt to market and behavioural or contextual needs promptly, while introducing common vision for both the offering and the processes available. These are:

Explore information to generate new offers and internal systems anticipating needs or demands and error patterns promoting self-healing actions;

Abstract internal systems and process complexity from the end-user, business and partners;

Enhance integration with third-parties, customers, suppliers and partners by having an open and standardised architecture;

Promote supporting systems organisation, delimiting roles and responsibilities;

Provide agility in launching new offers and adapting business processes to comply with customer needs and demands;

Take advantage of the already collected customer data and insights to promote and improve customer experience or elaborate new business streams;

Address competitors challenges, closing the gap on competitors' offers, being able to set the pace and drive innovation in the market;

Properly scale and monitor the information being processed, enhancing service levels to the customer and the correlation of generated data.

The DSP architecture must promote the integration between internal and external endpoints by imposing rules that organise both component and software build and adoption, while taking advantage of the ability to support and fulfil the needs at scale. The added capabilities and the openness of the architecture promote improved service levels and trust as key emotional factor towards the customers and partners.

Digital Transformation is a Journey, Not a Destination.

Organisations are pursuing large-scale change efforts to capture the benefits of digital trends, but even digitally savvy industries are struggling because it entails a deep reshaping of business, IT and customer interactions, and because current IT architectures are unable to address today's requirements.

As a journey, Digital Transformation carries out changes that should be embraced gradually, allowing organisations to ensure cross-functional internal alignment, prepare themselves properly and be successful. An important step is to upgrade to an IT architecture that sets the foundations for a full digital embracement, as it underlies the organisation's overall responsiveness to market dynamics.

Celfocus Digital Overlay Architecture is the cornerstone to support an architecture that fits in with modern paradigms of adaptability and evolvability. It keeps in line with the principles of an evolutionary architecture, relying on five key pillars and a set of principles that promote openness, flexibility, agility and lower time-to-market.

Enabling a prioritised capabilities introduction, migration or augmentation aimed at reducing dependencies on traditional supporting systems, Celfocus Digital Overlay Architecture defines the strategy to address a set of capabilities, such as being more agile at launching new offers and adapting business processes to comply with customer needs and demands; taking advantage of the collected customer data and insights to promote and improve customer experience; and enhancing integration with third-parties, customers, suppliers or partners by having an open and standardised architecture.

Should you be interested in learning more about Celfocus Digital Overlay Architecture, please get in touch with us through info@celfocus.com

CELFOCUS

About
Celfocus

Celfocus is a fast-growing, global high-tech company with a reputation for developing and implementing successful projects and solutions that drive business value.

By combining a deep business knowledge with the understanding of different technologies, while never losing sight of the customer experience, Celfocus built a reputation leveraged on an unexcelled track record.

Serving Clients in 25+ countries, Celfocus helps organisations transform their business in order to improve competitive positioning and ultimately their performance.

For more information about CELFOCUS, please visit our website
www.celfocus.com

Follow us in: in